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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/692,397

10/23/2003

Jacob Cherian

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BAKER BOTTS, LLP

910 LOUISIANA

HOUSTON, TX 77002-4995

EXAMINER

ROJAS, MIDYS

ART UNIT

PAPER NUMBER

2185

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
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3 MONTHS

03/29/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/692,397

Applicant(s)

JACOB CHERIAN

Examiner

Midys Rojas

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 March 2007.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8, 10-12, 14-20, 23 and 24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8, 10-12, 14-20, 23-24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 23 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed on 3/06/07 have been fully considered but they are not persuasive.

Applicant argues that Horst does not teach forwarding the write operation for processing such the write operation is not completed, but instead discloses deferring the completion of write commands by queuing the write commands. However, Horst discloses systems configured such that the host is informed that a write has been completed once the write data has been written to a write cache of a disk drive or an array controller but before the data has been written to disk (Col. 1, line 20-33). Therefore, the write operation is forwarded to the cache such that the write operation is not completed because it is being held in the cache. Even though the write operation will be completed at a later time when a cache flush occurs, it is not completed at that moment in time and will not be completed for some time. Therefore, Horst's disclosure reads on applicant's claimed invention. In Horst the return of the success status is represented by the act of informing the host that the write has been completed. The write operation is not forwarded for processing since it is instead held in the write cache; in holding the operation in the cache, the write operation is not completed.

Applicant argues that Horst does not teach determining whether I/O operations are associated with a data portion of the RAID or a non-data portion of the RAID, and filtering I/O operations that are associated with a data portion of the RAID, and not filtering I/O operations that are associated with a non-data portion of the RAID. However, in identifying write operations and forwarding the to the cache (as disclosed in Col. 1, lines 20-33), and identifying read

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operations and returning zeroes (as disclosed in Col. 3, lines 34-38), and identifying accesses to the lookup table and forwarding them for quick access (as disclosed in Col. 12, lines 44-57), the system is effectively determining whether I/O operations are associated with a data portion of the RAID (processing of writes through the cache and processing of reads by returning zeroes) or a non-data portion of the RAID (quick access of lookup table). Also in choosing to access the lookup table while only caching writes and return zeroes for reads, the system is also performing the filtering functions of the invention. These limitations are also met by the teachings of Johnson since Johnson et al. teaches a device drive filter 8, which intercepts, identifies, and filters access commands depending on their priority (paragraph 0022).

Applicant argues that Horst also fails to disclose returning a signal to a requesting application for I/O operations associated with a data portion of the RAID and not forwarding such I/O operations for processing. However, Horst discloses systems configured such that the host is informed that a write has been completed once the write data has been written to a write cache of a disk drive or an array controller but before the data has been written to disk (Col. 1, line 20-33). Therefore, the write operation is forwarded to the cache such that the write operation is not completed because it is being held in the cache. Even though the write operation will be completed at a later time when a cache flush occurs, it is not completed at that moment in time and will not be completed for some time. Therefore, Horst's disclosure reads on applicant's claimed invention. In Horst, the return of the success status is represented by the act of informing the host that the write has been completed. The write operation is not forwarded for processing since it is instead held in the write cache; in holding the operation in the cache, the write operation is not completed.

Applicant also argues that Horst does not disclose returning a "zeroed buffer" or a "buffer filled with zeroes" to an application that requested a read operation. However, Horst discloses increasing performance by returning zeroes to a requesting application in response to a read during RAID creation wherein the zeroes are returned without performing a read on the disk media (Col. 3, lines 34-38).

Applicant argues that Horst also fails to disclose "not forwarding" write operations for processing. However, Horst discloses systems configured such that the host is informed that a write has been completed once the write data has been written to a write cache of a disk drive or an array controller but before the data has been written to disk (Col. 1, line 20-33). Therefore, the write operation is forwarded to the cache such that the write operation is not completed because it is being held in the cache. Even though the write operation will be completed at a later time when a cache flush occurs, it is not completed at that moment in time and will not be completed for some time. Therefore, Horst's disclosure reads on applicant's claimed invention. The write operation is not forwarded for processing since it is not forwarded to the disk, it is only forwarded to the cache for the purposes of queuing it for later processing.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) that forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-8, 10-12, and 14-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Horst et al. (6,549,977) in view of Johnson (2002/0138670).

Regarding Claim 1, Horst discloses a method for volume manager based redundant array of independent disks creation (RAID, this system allows for the reduction of RAID rebuilding time, abstract), comprising:

monitoring input/output (I/O) operations (by array controller 124, steps 202-216, Figure 2, Col. 8, line 40- Col. 9, line 42) between an information handling system volume manager (I/O transfer and host interface circuitry 130) and an information handling system disk driver (122);

if a particular I/O operation is a write operation to the data portion of the RAID volume, returning a success status to the requesting application and not forwarding the write operation for processing, such that the write operation is not completed (“existing systems are typically configured such that the host is informed that a write has been completed once the write data has been written to a write cache of a disk drive or an array controller... but before the data has been written to disk”, Col. 1, line 20-33). The return of the success status is represented by informing the host that the write has been completed; the write operation is not forwarded for processing since it is instead held in the write cache, in holding the operation in the cache, the write operation is not completed; and

if a particular I/O operation is an access to a non-data portion of the disk RAID volume, passing the non-data portion access I/O operation to the disk driver for processing (access to lookup table within RAM 228 are allowed during system operation, Col. 12, lines 44-57 and since those operations must be performed in a quick access they must be passed to a driver for quick processing).

Horst does not specifically teach intercepting I/O operations between the volume manager and the disk driver and identifying a particular intercepted I/O operation from a requesting application.

Johnson et al. teaches a device drive filter 8, which intercepts, identifies, and filters access commands depending on their priority (paragraph 0022). It would have been obvious to one of ordinary skill in the art at the time the invention was made to employ the filter of Johnson in the system of Horst since such a filter would facilitate the identification of access commands to the data portion of the RAID (which in this case would be low priority) and access commands to the non-data portion of the RAID (in this case they would be high priority since they must be processed for quick access).

Regarding Claim 2, Horst discloses the method further comprising initializing creation of a parity based RAID wherein RAID-5 is a parity based RAID (Col. 5, lines 35-38).

Regarding Claim 3, Horst discloses the method further comprising creating a RAID-5 parity based RAID (Col. 5, lines 35-38).

Regarding Claim 4, Horst discloses an information handling system, comprising
at least one processor (124);
a memory operably associated with the processor (cache 132);
at least three information storage devices operably coupled to the memory and the processor (110); and

a program of instructions storable in the memory and executable by the processor, the program of instructions operable to:

process I/O operations directed to accessing RAID disk structures (increasing write performance, Col. 2, lines 26-38; increasing read performance, Col. 3, lines 34-38), and I/O operations directed to accessing RAID configuration information, by passing them to a disk driver for processing (access to lookup table within RAM 228 are allowed during system operation, Col. 12, lines 44-57 and since those operations must be performed in a quick access they must be passed to a driver for quick processing);

filter I/O operations directed to accessing a data portion of the RAID (since the system has the ability to process access requests to the lookup table and to the RAID data, it must intercept and identify the incoming requests), including for each write operation directed to the data portion of the RAID, returning a successful status to an application requesting the write operation and not forwarding the write operation for processing. (Cache 132 receives data received from host before it has been written, Col. 5, lines 48-53; “existing systems are typically configured such that the host is informed that a write has been completed once the write data has been written to a write cache of a disk drive or an array controller... but before the data has been written to disk”, Col. 1, line 20-33). The return of the success status is represented by the act of informing the host that the write has been completed. The write operation is not forwarded for processing since it is instead held in the write cache, in holding the operation in the cache; the write operation is not completed.

Horst does not specifically teach intercepting I/O operations between the volume manager and the disk driver and identifying a particular intercepted I/O operation from a requesting application.

Johnson et al. teaches a device drive filter 8, which intercepts, identifies, and filters access commands depending on their priority (paragraph 0022). It would have been obvious to one of ordinary skill in the art at the time the invention was made to employ the filter of Johnson in the system of Horst since such a filter would facilitate the identification of access commands to the data portion of the RAID (which in this case would be low priority) and access commands to the non-data portion of the RAID (in this case they would be high priority since they must be processed for quick access).

Regarding Claim 5, Horst discloses the information handling system further comprising the program of instructions operable to intercept I/O operations between a volume manager 130 and the disk driver of the information handling system 122 (interception being done by array controller 124, steps 202-216, Figure 2, Col. 8, line 40- Col. 9, line 42).

Regarding Claim 6, Horst disclose the information handling system further comprising the program of instructions operable to intercept all I/O operations between the volume manager and the disk driver during RAID creation (see abstract, the method of the invention provides reductions in RAID volume creation times; interception being done by array controller 124, steps 202-216, Figure 2, Col. 8, line 40- Col. 9, line 42).

Regarding Claim 7; Horst discloses the information handling system further comprising the program of instructions operable to verify that the information storage devices have been zeroed (activity bins are zeroed on demand before the first write, thus ensuring that they are zeroed, Col. 3, lines 19-24).

Regarding Claim 8, Horst discloses the information handling system further comprising the program of instructions operable to respond to read operations directed to the data portion by

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returning a zeroed buffer to an application requesting the read operation and not forwarding the read operation for processing (since during creation of the disk array all the data in the array is equal to zero, zeroes are returned without performing a read of the disk media, Col. 3, lines 34-38).

Regarding Claim 10, Horst discloses the information handling system further comprising the program of instructions operable for execution during creation of a parity-based RAID wherein RAID-5 is a parity based RAID (Col. 5, lines 35-38).

Regarding Claim 11, Horst discloses the information handling system further comprising the program of instructions operable for execution during creation of a RAID-5 parity-based RAID (Col. 5, lines 35-38).

Claim 12 is rejected using the same rationale as that of Claims 1 and 4.

Regarding Claim 14, Horst discloses the computer readable medium further comprising the program of instructions operable to return write operations associated with the data portion of the RAID with a good status ("existing systems are typically configured such that the host is informed that a write has been completed once the write data has been written to a write cache of a disk drive or an array controller... but before the data has been written to disk", Col. 1, line 20-33 wherein these writes are write operations of RAID data, cache 132 receives the RAID data received from host before it has been written, Col. 5, lines 48-53) to the requesting application and not forwarding the write operations for processing. The return of the success status is represented by the act of informing the host that the write has been completed. The write operation is not forwarded for processing since it is instead held in the write cache, in holding the operation in the cache; the write operation is not completed.

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Claim 15 is rejected using the same rationale as that of Claim 8 wherein zero is a predefined value.

Claim 16 is rejected using the same rationale as that of Claim 8.

Claim 17 is rejected using the same rationale as that of Claim 5.

Regarding Claim 18, Horst discloses the computer readable medium further comprising the program of instructions operable to pass to the disk driver for processing, I/O operations associated with configuration of the RAID (access to lookup table within RAM 228 are allowed during system operation, Col. 12, lines 44-57).

Regarding Claim 19, Horst discloses the computer readable medium further comprising the program of instructions operable to pass to the disk driver for processing, I/O operations concerning RAID disk structures (access to lookup table within RAM 228 are allowed during system operation, Col. 12, lines 44-57).

Claim 20 is rejected using the same rationale as that of Claim 11.

Claims 23 and 24 are rejected using the same rationale as that of Claim 8.


Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Midys Rojas whose telephone number is (571) 272-4207. The examiner can normally be reached on M-F 5:30am - 4:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sanjiv Shah can be reached on (571) 272-4098. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Midys Rojas
Examiner
Art Unit 2185

MR


SANJIV SHAH
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2100